REMARKS

Claims 1, 3, 5, 7-12, 14, and 17-22 remain pending in the case. Further examination and reconsideration of the presently claimed application are respectfully requested.

Section 103 Rejections

The Office Action withdrew indication of allowability of claims 2, 3, 5, 16, and 17 based on newly cited reference U.S. Patent Application No. 2003/0079691 to Shang et al. (hereinafter "Shang"). Accordingly, claims 1, 3, 5, 7-12, 14, and 17-22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,684,669 to Collins et al. (hereinafter "Collins") in view of Shang, and further in view of U.S. Patent No. 6,125,025 to Howald et al. (hereinafter "Howald").

To establish a case of *prima facie* obviousness of a claimed invention, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. Second, there must be a reasonable expectation of success. As stated in MPEP 2143.01, the fact that references can be hypothetically combined or modified is not sufficient to establish a *prima facie* case of obviousness. *See In re Mills*, 916 F.2d. 680 (Fed. Cir. 1990). Finally, the prior art references must teach or suggest all the claim limitations. *In re Royka*, 490 F.2d. 981 (CCPA 1974); MPEP 2143.03 (emphasis added). Specifically, "all words in a claim must be considered when judging the patentability of that claim against the prior art." *In re Wilson* 424 F.2d. 1382 (CCPA 1970). Using these standards, Applicants contend (i) that the hypothetically combined cited art fails to teach or suggest all features of the currently pending claims; and (ii) that the references cannot be hypothetically combined since there is no impetus or motivation described in those references to form the combination suggested in the Office Action. Several distinctive features of the present invention are set forth in more detail below.

Neither Collins, Howald, nor Shang, individually or in combination, teach or suggest a solenoid that is used for a particular purpose: to measure current from (or in) the solenoid proportional to an applied lifting force. Independent claim 1 describes in its first element, a "solenoid . . . wherein the current from the solenoid is a measured current." Furthermore, claim 1 describes a sensor that can monitor current "proportional to the applied lifting force." Independent claim 11 is similar to claim 1 in that the last element describes "determining the current in the solenoid needed to oppose a downward force of the wafer against the extendable pin." Thus, each independent claim of the present

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application not only describes a solenoid, but more importantly describes a particular function of that solenoid and the current measured or determined from or in the solenoid proportional to an applied lifting force.

As described in the present specification, the applied lifting force can be monitored through, for example, a feedback system to "prevent the application of excessive force against the wafer" during a dechucking operation (Specification -- pg. 4, lines 9-16). One way to determine the applied lifting force is to monitor the force on the lifter pin and to dechuck when the force reaches a minimum value (Specification -- pg. 4, lines 19-27). Monitoring the force on the lifter pins can be achieved by monitoring the current in the solenoids which drive the lifter pins "since the current in a solenoid is proportional to the force it exerts, the opposing electrostatic force can be indirectly measured in this manner." (Specification -- pg. 5, lines 3-6.) Thus, monitoring the current from or in the solenoids 40a and 40b will determine the amount of electrostatic force applied to the lifter pins by the wafer (Specification -- Fig. 4; pg. 8, lines 25-30).

Contrary to the present claims, neither Collins nor Howald describe a solenoid lift mechanism. Specifically, Collins illustrates lifting using a pneumatic lift mechanism (Collins -- Fig. 1; col. 7, lines 9-12). Similar to Collins, Howald also describes a "mechanical mechanism" for dechucking (Howald -- col. 2, lines 35-37). Thus, nowhere in Collins or Howald is there any suggestion that a solenoid (which connotes electronic activation) is used to drive extendable lifting pins as claimed. While Collins and Howald lack disclosure of a solenoid, Shang appears to describe its lift plate 154 as coupled to an actuator, such as a solenoid (Shang -- ¶ 0033). While use of a solenoid for dechucking operations is part of what is claimed, claims 1 and 11 are not limited to this feature. Instead, as described above, claims 1 and 11 use the current from or in the solenoid to measure the applied lifting force needed to dechuck a wafer without exerting excessive forces on that wafer.

Using the current not only to measure the applied lifting force needed for dechucking, but also increasing the current when the measured current reaches a predetermined minimum to complete the dechucking operation is nowhere taught or suggested in any of the cited references. For example, Shang makes no mention whatsoever of any current within (or from) a driving solenoid, much less the present claimed feature of measuring or monitoring that current. In fact, when substrate 140 resides on chuck assembly 138, second ends 164 and 166 of pins 150 and 152 do not come in contact with lift plate 154 (Shang -- Fig. 1). Absent any contact to lift plate 154, the solenoid which drives lift plate 154 cannot possibly measure any current in the solenoid needed to oppose a downward force on substrate 140 (Shang

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-- Fig. 1). It is not until the upward force appears on lift plate 154 will there be any contact (Shang -- Figs. 2A and 2B). However, as described in Shang, once pins 150 and 152 exert upward, there is no measurement or reading taken from current that passes from or in the solenoid that drives lift plate 154 (Shang -- Fig. 1). This is due to the fact that monitoring or measuring the applied lifting force is not needed in Shang since dissimilar linked pins 150 and 152 overcome any deleterious bowing effects of lifting the substrate from the chuck.

It appears the Office Action concedes that Collins does not disclose a solenoid lift mechanism and, while Shang does, neither Collins nor Shang describe measuring current in or from the solenoid proportional to an applied lifting force (Office Action -- pg. 3). Yet, the Office Action appears to suggest that Howald teaches "measuring a current proportional to the applied force." (Office Action -- pg. 3.) Applicants respectfully disagree with the characterizations of Howald as it pertains to the present independent claims 1 and 11.

Claims 1 and 11 do not recite measuring just any current. Instead, they explicitly describe the current as that which exists from or in a solenoid. Moreover, the current from or in the solenoid is that which is proportional to the applied force needed to lift the wafer from the chuck. While Howald adequately describes measuring current, the current that is measured in Howald is not the current in or from a solenoid. Instead, Howald clearly describes the current as the current which "flows through the workpiece and the electrostatic chuck" or, according to one embodiment, is current "flowing through the chuck as a first workpiece is removed from the chuck." (Howald -- col. 4, lines 14-15; col. 7, lines 66-67.) Howald makes clear that current within the chuck and/or workpiece (i.e., wafer) must be monitored to determine resistivity ranges of the workpiece in order to accommodate different types of workpieces such as, for example, glass or semiconductor (Howald -- col. 1, lines 8-10; col. 2, line 57 - col. 5, line 44). In order to take into account different types of workpieces and the corresponding variable chucking forces which retain those workpieces, resistivity of the chuck and/or workpieces must be measured by measuring the current therethrough -- i.e., not in/from the solenoid which drives the extendable pins of the lifting mechanism.

Applicants respectfully traverse this rejection since the hypothetical combination of Collins, Howald, and Shang does not teach or suggest measuring current in or from a solenoid to determine a proportional applied lifting force. Moreover, Applicants assert that it is impermissible for the Office Action to make the attempted hypothetical combination. Nowhere is there any suggestion in Collins or Howald for a solenoid, much less a current-driven solenoid. While a generalized solenoid is described in

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Shang, there is no suggestion to one of ordinary skill in the art when reading the solenoid-less teachings of Howald and Collins that one could impart a solenoid from Shang. As clearly required under MPEP 2143.01, there must be some suggestion or motivation in the solenoid-less teachings of Howald and Collins to substitute a solenoid for the pneumatic lift mechanism described therein. The fact that references can be hypothetically combined or modified is not sufficient to establish a *prima facie* case of obviousness. *In re Mills*, 916 F.2d. 680 (Fed. Cir. 1990).

For at least the reasons set forth above, Applicants assert that independent claims 1 and 11, as well as claims dependent therefrom, are patentable over the cited art. Accordingly, Applicants respectfully request removal of this rejection.

CONCLUSION

This response constitutes a complete response to all issues raised in the Office Action mailed November 28, 2003. In view of the remarks traversing the rejections, Applicants assert that pending claims 1, 3, 5, 7-12, 14, and 17-22 are in condition for allowance. If the Examiner has any questions, comments, or suggestions, the undersigned earnestly requests a telephone conference.

No fees are required for filing this amendment; however, the Commissioner is authorized to charge any additional fees, which may be required, or credit any overpayment, to LSI Logic Corporation, Deposit Account No. 12-2252/01-207.

Respectfully submitted,

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